

Control Valve Response Criteria

(note that the closure member (trim) not just the actuator shaft must move)

Parameter	“Great”	“Good”	“Fair”	“Poor”	“Bad”
Pre-stroke Deadtime	0.1 sec	0.2 sec	0.4 sec	1 sec	5 sec
Stroking Time (0 - 100%)	2.5 sec	5 sec	10 sec	20 sec	100 sec
Primary Lag Time	0.25 sec	0.5 sec	1 sec	2 sec	10 sec
Secondary Lag Time	0.05 sec	0.1 sec	0.2 sec	0.4 sec	1 sec
Resolution (stick-slip)	0.1 %	0.2 %	0.4 %	1 %	5 %
Deadband (backlash)	0.2 %	0.4 %	0.8%	2 %	10 %

Sliding stem (globe) valves with low friction packing, diaphragm actuators, and smart digital positioners generally have a “good” response rating. Large valves may require a volume booster on the positioner output to meet the criteria for pre-stroke deadtime, stroking time, and lag times. Note that the resolution and backlash values listed include operation within 5% of the seat where stiction is greatest. Special plug designs of small valves for pH control that minimize seating friction have demonstrated a “great” rating. Throttling valves from control valve manufacturers generally have “fair” to “good” ratings. Piping valves originally designed for on-off operation and wafer dampers often fall into the “poor” to “bad” categories. Putting a digital positioner on a piping valve does not solve the problem when the position feedback of actuator shaft is not representative of closure member position (common problem with rotary valves).